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AUTHOR Lee, Valerie E.; Wilson, Thomas C.
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ABSTRACT

Research studies investigating group differences in academic achievement consistently document lower scores for blacks than for whites, who typically score about one standard deviation above their black counterparts. Many controversial explanations for black achievement deficits have been advanced, ranging from cultural deprivation to inferior schooling. Focusing more on educational than cultural differences and using National Assessment of Educational Progress data, this study investigates a sample of 661 black eighth graders scoring above the national average in reading proficiency. In separate comparisons with other groups (the black population scoring below the national average in reading achievement and a sample of white high-achieving students), school characteristics and student academic behaviors were identified that partly explain black-white achievement differences. High-achieving black students resemble their white counterparts in amount of reading, homework, and television watching; however, these students are as likely as their black counterparts to attend schools with high proportions of minority and poor students, although black high-achievers' family socioeconomic status is about midway between that of the two comparison groups. Included are technical notes, 52 references, 4 tables, and an appendix defining constructed variables used in the study. (Author/MLH)

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High-Achieving Black Students: What Characterizes the Schools They Attend and Their Academic Behaviors?

Valerie E. Lee
University of Michigan

Thomas C. Wilson
University of Houston

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Abstract

That there are substantial race differences in academic achievement is undisputed, with white students typically scoring about one standard deviation above their black counterparts. The reasons which have been advanced for why this is so are more controvertial, ranging from ascribing such differences to cultural deprivation of black families to attributing black achievement deficits to the generally inferior schooling of these students. Focusing more on educational than cultural differences, this study examines black/white achievement differences somewhat differently from previous research on the topic. Using data from the 1983-84 National Assessment of Educational Progress (NAEP) assessment of reading proficiency, the study focuses on the sample of 661 black 8th grade students who score above the national average in reading proficiency. In separate comparisons to (a) the remainder of black 8th graders (n=1894), and (b) to their white high-achieving counterparts (n=7,480), we have identified characteristics of schools and academic behaviors of students which, in part, explain black/white achievement differences. High-achieving black students generally resemble their white counterparts in such academic behaviors as amount of reading, homework, and television watching. However, these students are as likely as their black counterparts to be found in schools which enroll high proportions of minority students and where students are poor, although their family SES is about midway between that of the two comparison groups. School factors such as student commitment, a positive disciplinary climate, and an enriched curriculum partially explain racial differences in such academic behaviors as the positive use of time and student grades. These factors, in turn, are positively related to reading proficiency. Difficulties of using NAEP data for causal analysis are discussed.

High-Achieving Black Students: What Characterizes the Schools They Attend and Their Academic Behaviors?

Nationally representative research which investigates group differences in achievement consistently documents lower scores for blacks than for whites. Such recent federally-funded studies as the National Assessment for Educational Progress (NAEP) or High School and Beyond (HS&B) have shown that blacks score about a standard deviation below whites in reading, writing, vocabulary, and mathematics achievement (Applebee, Langer, & Mullis, 1986; NAEP, 1985; Rock, Ekstrom, Goertz, & Pollack, 1985). Although these black-white achievement differences have diminished over the last decade, they remain substantial (NAEP, 1985; Rock, Ekstrom, Goertz, Hilton, & Pollack, 1984).

This study examines the phenomenon of reading achievement levels for American black and white students from a somewhat different perspective than most research which examines such differences. First, the study investigates achievement in middle school (8th grade), while most achievement studies concentrate on either elementary or high school students. Since very few students (either black or white) have dropped out of school at that point, the investigations do not suffer from the potential selection bias that differential dropout rates introduces to racial comparisons in achievment later in high school. Second, the focus of the study is on a nationally representative group of high-achieving black students -- namely, those who score above the national average in reading achievement. The family backgrounds, school characteristics, and academically related behaviors of these students are contrasted with two different comparison groups: (a) the rest of the black population (i.e. those who score below the national average in reading achievement); and (b) the counterpart sample of white students who score above the national average on the same test. How does the group of high-achieving blacks compare to both their racial counterparts who differ from them on achievement or to their achievement counterparts who differ from them in race? By directing attention to a non-trivial group of minority students who are successful in educational terms, and by isolating the characteristics by which they resemble and differ from each of the two comparison groups, we attempt to investigate the question of race difference in academic achievement within a more positive framework than that which typifies research in this area.

Background

The most common explanation for the unfortunate phenomenon of lower academic achievement for racial minority students has emphasized the environmental and cultural deficiencies minority children bring with them to school, in comparison to children from the dominant (white, middle class) culture. However, certain social researchers vigorously oppose the use of this "cultural deficit" model in explaining race differences in achievement. Zinn (1987), for example, presents evidence showing that "....poverty and family structure among racial-ethnics continue to be created more by economic conditions external to the family than by race-specific cultural patterns" (p.3). The major attempts to explain this phenomenon by emphasizing the detrimental effect of factors such as environmental deficiencies, genetic inheritance, and cognitive socialization have been critized on methodological grounds, as well. Overall, many researchers consider a preference to view individual differences over commonalities, a blindness to cultural differences, a denial of children's ability to learn on their own, and overly simple constructs for school success and knouledge as inappropriate explanatory models for explaining race differences (e.g., Ginsburg, 1972, 1986).

This stream of research has been more explicit in considering the effect of minority status as a <u>socio-psychological</u> phenomenon on academic achievement. The relatively low status of blacks in the American social and cultural stratification system goes further in explaining school performance than genetic, environmental, or cultural factors. Denial of access to desirable jobs, job ceilings, and the potential cultural bias of of "white" intelligence tests have contributed to the lower achievement of black youth (Ogbu, 1986). In addition to the limitations placed on their achievement, black students face a triple cultural bind, according to these researchers. They belong at once to three groups: the mainstream, the African-rooted black culture, and a status oppressed minority. Each of these group memberships carries with it requisite identities, expectations, and values. Not only are there problems associated with biculturality, but the frames of reference for Euro-American and Black African cultures are diametrically opposed. Not surprisingly, this situation is thought to influence academic performance through higher levels of stress, less effective study time, and reduced recall ability (Boykin, 1986; Gougis, 1986).

The focus of this body of research has been on causal elements external to the individual and the individual's socio-economic situation. Indeed, it points directly to factors establishing an individual's status regardless of ability or performance. Increasingly, social scientists in general, and minority group members in particular, have come to resent explanations that deal only with variables over which the individual has no control (race, ethnic background, sex, family SES, etc.) or that perpetrate the very notions that keep students at low achievement. Attributing the causal factors for lower minority group performance on achievement tests primarily to factors that are external to the direct educational processes (i.e., outside the purview of schools) is interpreted by some as an exculpation of the segment of society charged with fostering academic achievement in America's young people from that responsibility (Edmonds, 1979; Neisser, 1986). This accusation is driven, in part, by the existence of research that indicates significant relationships between school-level variables and achievement (Coleman, Hoffer, & Kilgore, 1982; Greeley, 1982; Jones, 1984; Keith & Page, 1985; Lee & Bryk, 1988a; Rutter, Maughan, Mortimore, Ouston, & Smith, 1979; Stauffer & Hinzman, 1980).

Investigating differential treatment for minority students is not new. It is rooted in the 1954 Supreme Court decision regarding desegregation and can be traced back even further. More recently, however, the focus has shifted to differential treatment within schools in an attempt to identify school-level variables that can realistically be manipulated to effect increased minority student achievement. Among the most common variables tested are the number of courses in particular content areas, teacher-student interactions, quantity and quality of instruction, staff expectations, disciplinary environment, school climate, and school tracking orientation. Although the relative influence of these and other variables differs among studies and data sets, in general, the variables have been significant (albeit marginal) predictors of achievement differences (Ascik, 1984; Coleman et al., 1982; DeBord, Griffin, & Clark, 1977; Felsenthal, 1983; Jones, 1984; Lee & Bryk, 1988b; Neisser, 1986; Scott-Jones & Clark, 1986; Welch, Anderson, & Harris, 1982).

Achievement Differences By Race

Black-white achievement differences over time. Although research on black-white achievement differences has consistently documented black achievement below that of whites, more recent research has focused on the longitudinal

nature of change in black-white achievement differences. Several studies investigating achievement trends over time have concluded that minority students in general, and blacks in particular, have made more gains than whites (Applebee, et al., 1986; Burton & Jones, 1982; DeBord et al., 1977; Kennedy, Birman, and Demaline, 1986; Koretz, 1987; NAEP, 1985; Rock, et al., 1984).

In a comparison of the achievement levels of high school seniors in 1972 and 1980, Ekstrom, Goertz, and Rock (1986), using large nationally representative samples from HS&B, concluded that student scores generally declined in vocabulary, reading, and math achievement. A primary reason for the overall decline in achievement for that period was the increased proportion of non-white students in the high school population, since achievement levels for minority students are lower. The greatest declines, however, were found for white students. When comparing the achievement decline for separate racial/ethnic subgroups, the actual declines were less for both blacks and Hispanics. These researchers concluded that there was also a considerable decline in the academic orientation of students, i.e., in school-related behaviors such as homework and academic course enrollment. This decline was the second major contributor to the test score decline over this period.

In a large ongoing national assessment of the reading proficiency of American students in 4th, 8th, and 11th grades, this same trend has been noted (NAEP, 1985). This study, however, found small overall achievement gains in reading during the period 1971 to 1984, rather than the achievement declines noted by the HS&B study described previously. Nevertheless, while the gains from 1971 to 1984 for whites were almost imperceptible, the gains for both Hispanic and black students were considerably greater than those for whites. The gains were particularly noteworthy for blacks. However, despite these gains in the reading proficiency of blacks over time, the reading proficiency difference between blacks and whites remained substantial in 1984.

Another national assessment study examined the impact of Title I money on the improvement of schools (National Assessment for Educational Progress, 1981). Although Title I (now Chapter I) schools do not enroll black students exclusively, there are considerable numbers of minorities in poorer school districts where Chapter I funds are invested. The study found that from 1970 to 1980 the mean reading score gap between Chapter I schools and non-Chapter I schools

diminished. This finding lends support to the existence of a general trend in differential achievement gains for minority students, and suggests that social programs, such as subsidizing poorer school districts, do, to some degree, influence achievement. Similar suggestions of the effectiveness of compensatory educational programs in closing the minority gap were echoed in a broad study examining trends in academic achievement sponsored by the Congressional Budget Office (Koretz, 1987) and in a more recent national evaluation of Chapter I (Kennedy, et al., 1986).

Yet another report has documented the same trend, focusing on black-white achievement differences (Jones, 1984). Using both NAEP data for three age groups and Scholastic Aptitude Test (SAT) data for high school students who took that test, this paper documents a consistent decline in white-black difference scores on both verbal and math tests over the last two decades. The SAT results are particularly noteworthy, since during this period there was a consistent increase in the numbers of black students taking these tests. Although Jones also hints that social and educational programs initiated in this period (school desegregation and specific programs for the disadvantaged) could possibly account for the narrowing gap, he is unable to provide direct evidence to confirm this. Instead, he concludes that ethnic group differences in high school math achievement, and the reduction of those differences in recent years, is more likely to be attributable to the trend toward fewer black-white differences in mathematics course enrollments. That is, Jones suggests that a likely explanation for the narrowing gap in black-white achievement is related to the direct schooling processes for these two groups.

Jones' (1984) conclusion is supported in principle by research that has shown increased math achievement scores for females who have taken more math courses. Furthermore, the connection between academic background and achievement makes intuitive sense. The content of schooling and the accessibility to academic pursuits for groups previously underrepresented must have an impact on test scores measuring achievement in these areas. If not, one could reasonably question the value of schooling altogether (Scott-Jones & Clark, 1986; Pallas & Alexander, 1983).

Achievement differences by grade levels and content areas. Although the existence of black-white achievement differences is well documented, the

variation in the differential by grade and over content areas is not consistent. Studies using large national assessment data and longitudinal nationally representative data, such as NAEP and HS&B, have shown this variability (Burton & Jones, 1982; Greeley, 1982; Jones, 1984; Keith & Page, 1985; NAEP, 1985). A closer analysis of the reading proficiency of American students at 4th, 8th, and 11th grades (NAEP, 1985) shows this variation in black-white reading achievement differences over these grade levels. Despite the generally minimal gains from 1971 to 1984 for whites at all three levels, the 9-year-olds did demonstrate higher gains than the other two white age groups. Greater gains were demonstrated by black students across the board with the highest increase for 17-year olds. The most dramatic changes between assessments were for black 17-year-olds (1980-1984) and black 9-year-olds (1971-1975).

In another study, using NAEP data from the 1970s, Burton and Jones (1982) report a consistent decline over time in white-black achievement differences across different curricular areas (writing, science, mathematics, social studies, and reading) for ages 9 and 13. The decline in the gap is most dramatic in reading for 9-year-olds and in writing for 13-year-olds, approximately a 7-point drop in each case between 1970 and 1980. Writing and mathematics are relatively the most difficult content areas for 9 and 13-year-olds respectively. The least amount of improvement (in the race differential) occurred in science. Burton and Jones also suggest that these results may have been influenced by programs designed to foster educational opportunity. The relationship, however, remains controversial and empirically undemonstrated.

The relative difficulty of mathematics for black 13-year-olds appears to continue for black 17-year-olds. Using data from a special NAEP mathematics assessment that adjusted statistically for the disproportionate dropout rates of 17-year-olds, Jones (1984) found that while 13-year-old blacks gave 17% fewer correct answers than 13-year-old whites, the difference grew to 25% by age 17. These high school achievement differences are verified by HS&B data as well, although overall achievement scores improved from sophomore to senior years (Coleman, et al., 1982; Rock, et al., 1985).

Factors Explaining the Black-White Achievement Gap

Individual attitudes and behaviors. Attitudes toward school and time devoted to academic-related tasks are two measures that are influential in

achievement equations. Brookover and Schneider (1975), in an analysis of fifth grade attitudes, discovered that students' sense of futility in the school social system accounted for nearly 45% of the remaining variance in student achievement after race, SES, and community were controlled. Despite a strong correlation between the sense of futility and background variables, the size of this relationship suggests that students' understanding of the role they play in school determines to some extent how well they perform. Likewise, Walberg and Tsai (1984, 1985) found that reading attitude had a significant positive influence on performance.

There is some evidence to suggest that black students' attitude toward success in school may be more strongly related to achievement than those of whites (Hall, Howe, Merkel, & Lederman, 1986). Trotter (1981) found significant differences in attitudes toward school and perception of peers' attitudes between high- and low-achieving black males. There were also significant differences on academically related issues, such as the importance of good grades, the importance of study, doing homework, and cooperating with teachers. Trotter concluded that peer reference groups exert a negative influence on academic learning for black males.

Time devoted to academic-related tasks is also an important behavioral element. The two most common measures of academic time are hours spent on homework and television, with the two (understandably) inversely related. Although black students tend to watch more television, they do not appear to spend less time on homework. Once other factors are taken into consideration, the effect of hours of television on achievement diminishes, but it does remain a symbol of time spent away from academic pursuits (Coleman et al., 1982; Greeley, 1982; Walberg & Tsai, 1984, 1985).

Family educational resources. In addition to background factors that measure a family's financial situation, social status, and race, some researchers have investigated the influence of other family resources -- particularly those that seem logically related to educational activities -- on scholastic performance. These resources are of two types: items available in the home (magazines, newspapers, books, typewriters, etc.) and parental involvement in the child's development (awareness of and reward for intellectual attainment, use of English at home, involvement with school). These factors, although they

may vary in significance from community to community, explain a portion of student achievement and represent a point of white-black difference in the home learning environment (Greeley, 1982; Shea, 1977; Walberg & Tsai, 1984, 1985).

School climate. The existence of variation in achievement differences between schools has led some researchers to investigate characteristics of schools, in addition to family SES, individual behaviors, and family resources, influence minority achievement. Research on "effective schools" emphasizes school-level variables that educators can manipulate. Despite the apparent lack of consistency in results and methodological weaknesses (e.g., small sample sizes and limited correlational outcomes), this body of research has an intuitive sense about it. It seems appropriate that schools should have some influence on student development (Mackenzie, 1983; Purkey & Smith, 1983; Rowan, Bossert, & Dwyer, 1983). To say this is not to deny the limitations of specific studies; rather, it is a recognition that, in fact, some schools are better than others irrespective of their clienteles. This research stream has shown a curiosity to find out what makes schools "better" in this way. The philosophical underpinning of these studies seeks to identify educationally related factors that appear to encourage achievement in black students, rather than relying on socioeconomic and family factors that are often detrimental.

Although not all effective schools research has agreed on the salient factors for school effectiveness, several common themes have emerged. Effective schools, usually identified in terms of above-average student achievement scores (frequently for disadvantaged students), have strong instructional leadership from the principal, closely monitored high expectations for student achievement, clear goals, and an environment of order and discipline (Clark, Lotto, & McCarthy, 1980; Edmonds, 1979; Felsenthal, 1983; Hallinger & Murphy, 1986; Purkey & Smith, 1983). Other studies, not included in the effective schools genre, have identified similar elements that affect student achievement. A shift from emphasizing input variables (per-pupil expenditures, library resources, and buildings) to studying the effects of change in process variables (classroom interaction, academic demands, and school social systems) has occurred over the past twenty years.

More generally, Rutter et al. (1979) applied the concept of "ethos" to schools as the culture within which individuals function and processes operate.

This organizational phenomenon is the basis of Purkey and Smith's (1983) theory of school improvement which includes elements of content (structure, roles, norms, values, etc.) and process (political and social relationships, information flow). Although these factors are often fuzzy to define and difficult to measure -- not to mention difficult to manipulate -- the image and representation of the school in analyses are more complete. A model including not only personal and family factors, but also the factors that are part of school life -- peer relationships, quality of instruction, social environment -- and the interrelationships among all of these variables provides a significant (albeit unparsimonious) prediction model (Coleman et al., 1982; Mackenzie, 1983; Lee & Bryk, 1988b; Parkerson, Lomax, Schiller, & Walberg, 1984; Purkey & Smith, 1983; Rowan et al., 1983; Rutter et al., 1979; Tomlinson, 1981).

Catholic school effect on minority achievement. Several studies use HS&B data from both 1980 and 1982 to investigate the comparative achievement levels of minority and white students in Catholic and public secondary schools (Bryk, Holland, Lee, & Carriedo, 1984; Coleman et al., 1982; Greeley, 1982; Keith & Page, 1985; Lee & Bryk, 1988a, 1988b). Uniformly, these studies have concluded that the difference between the achievement of white and minority students is smaller in Catholic than public schools. Since different types of students attend these two types of schools, it is difficult to separate these selection factors from achievement differences.

Using 1983-84 reading data from NAEP, Lee (1986) found that the reading proficiency scores of blacks and whites attending Catholic school were considerably closer to one another than the national averages for these two groups across all three grade levels assessed by NAEP. Although this analysis did not adjust for possible selection factors that might account for these results, these findings are consistent with those reported by other studies of high school students (Coleman et al., 1982; Greeley, 1982; Keith & Page, 1985).

An analytic approach that is relatively free of the selection question mentioned above, is to examine the gain in achievement for the same minority and white students from their sophomore to their senior years in high school. This is a considerably stronger method of analysis than the cross-sectional gains described earlier in this paper (Lee, 1986; NAEP, 1985; Rock et al., 1984), since those comparisons were not made on the same students. Longitudinal

gain-score analyses have also found that minority students in Catholic school gain more than whites in all six achievement areas measured by HS&B (Bryk, et al., 1984; Hoffer, Greeley, & Coleman, 1985). In fact, Jencks (1985, p. 134) has concluded that "[t]he evidence that Catholic schools are especially helpful for initially disadvantaged students is quite suggestive." For Jencks, "disadvantaged" includes both minority status and SES.

* * * * *

The present study addresses the phenomenon of black-white achievement differences from an inclusive perspective, exploring individual, family, and school variables. In addition, while it appears to be the case that on average blacks score lower than whites on achievement tests, this finding should not blind us to the fact that there are considerable numbers of black students who are high achievers. We have chosen to center our investigation on this group of students. Moreover, we focus our efforts on identifying characteristics of the students more closely related to their educational experiences than to their family background. That is, we concentrate on isolating those factors specifically related to the schools in which high-achieving black students are likely to be found, and identifying specific academically-related behaviors which these students are likely to exhibit.

Method

Sample and Data

Data from the National Assessment for Educational Progress (NAEP) 1983-84 reading assessment are used. The NAEP sampling design includes a two-stage random probability sample of schools and students. Although NAEP assessed three age/grade groups (4th grade/9 years old; 8th grade/13 years old; 11th grade/17 years old) of over 20,000 students each, we have used the 8th grade sample in this study. This decision was made for several reasons. First, most of the recent race/ethnicity studies of academic achievement have focused on high school students, primarily due to the availability of HS&B. An investigation of achievement before students reach high school reduces the influence on achievement of more differentiated learning experiences (e.g. tracking and ability grouping -- see Gamoran, 1987.) Second, the likely bias due to the

greater likelihood of blacks dropping out of school prior to the end of high school than whites is avoided (Coleman, et al., 1982; Rock, et al., 1985). Third, available research on junior high school achievement is limited, compared to either elementary or secondary levels. Fourth, the 4th grade NAEP data file has considerably more missing data on important family background measures (specifically parent education) than the 8th grade file. In addition, the reliability of other background measures for a self-report student survey of 9-year-old is limited. Because our investigation focuses on achievement differences between blacks and whites, students in the Hispanic and "other" race/ethnicity groups were eliminated from the sample.

Target group. The study focuses on high-achieving black 8th graders. The "high achievement" group is defined as those students who score above the population mean on reading proficiency (260.7 on a scale that runs from 0 to 500 -- Note 1). Since the population is largely (74.0 percent) white, the population mean is close to the white mean of 266.7. However, the mean reading proficiency for blacks (240.7) is below the white mean, so that the proportion of blacks classified as "high-achieving" is considerably less than half (26%) of the black sample (661 of a total black sample of 2,555). We are interested in investigating the differential effect of Catholic and public schooling on these students. Since the sample of students attending non-Catholic private schools is small (3% of the total, compared to 10% percent in Catholic schools), we have also eliminated these students from the analysis.

Comparison groups. The sample of high-achieving blacks is compared to two separate groups. First, we compare them to the rest of the black sample, i.e. those black 8th graders whose reading proficiency level is below the overall population mean (n=1,894). The second comparison group consists of high-achieving white students, also defined as those who scored above the population mean (n=7,480). Two separate comparison groups were selected in order to determine the similarities and differences (other than achievement) between high-achieving blacks and, first, their black student counterparts who score below average. Specific comparisons focus on differences in family background, in the types of schools each of these two groups of black students attend, and their academic behaviors in those schools. In addition to the within-black comparison, we also look at the characteristics which differentiate these high-achieving blacks from their white counterparts, other than race. The same

areas of focus as the within-black comparisons are examined. The total sample for the sample of 8th grade NAEP reading assessment of black and white students in Catholic or public schools is 15,494.

Descriptive Differences Between Groups

Mean values for the background, school, behavioral, and achievement variables considered in this study for the three analytic groups described above are presented in Table 1. Means for blacks who score below average in reading proficiency are found in Column 1, the target group of high-achieving blacks in Column 2, and high-achieving whites in Column 3, along with standard deviations. The construction of variables listed in Table 1 and throughout the analyses in this paper are detailed in the Appendix. The characteristics of the high-achieving blacks fall into four categories when related to the two other comparison groups. That is, for certain variables the group most closely resembles other black students. On other measures, the group falls midway between the two comparison groups. On a third set of variables, the high-achieving blacks more closely resemble their white counterparts. For a few descriptive characteristics, the target group looks different from either of the comparison groups.

Insert Table 1 about here

Background differences. The families of black students are of considerably lower social class than white group, with the high-achieving black group about midway between the two comparison groups (and about .2 s.d. units below the population mean of 0). Both high-achieving groups are about one-half year younger than the below-average black sample, which also exhibits considerably more variability in age. This suggest that the latter group contains a substantial proportion of overage students. Both groups of black students, whether above or below the mean achievement level, are more likely to reside in urban areas than the white comparison group. High-achieving black students are, however, somewhat less likely to come from rural areas than either group (26 percent vs. 32 and 33 percent). In fact, almost half of both groups (45 and 46 percent) come from urban areas, compared to only 21 percent for high-achieving whites. All three groups report that over half of their mothers work, with black students reporting the highest proportions of working mothers, particularly the high-achieving black group, 75% of whose mothers work.

School differences. There are the similarities between the schools black students of both groups attend. This is particularly striking in comparing the proportions of minority students and faculty in these schools. For example, 48 and 53 percent of the enrollment of the schools these students attend are minority students (compared to only 12 percent for the white group), and the proportion of minority faculty is also correspondingly high (33 and 40 percent for the schools the two groups of black students attend compared to only 8 percent minority faculty in the schools the white group attends. The intermediate position for the target group in the SES rating of the school reflects the individual SES measure, a pattern observed with the student commitment factor, as well. The degree to which schools these students attend offer an enriched curriculum is about midway between the black and white comparison group means, and differs from each extreme by about .1 s.d. unit. The proportion of students in remedial reading in the schools high-achieving blacks attend is about midway between the two groups (18 percent, compared to 23 and 11 percent for the two comparison groups). On certain school measures -- size and student/faculty ratio -- there is very little difference between the three groups. High-achieving blacks are somewhat more likely than below-average blacks to be found in Catholic school (10 vs. 5 percent), but their Catholic school enrollment is roughly comparable to that of high-achieving whites (12 percent).

Academic behavioral differences. Black students in the two groups spend slightly more time watching television than the white comparison group. The positive use of time of the target group falls between the two extremes, as well (-.10 compared to -.29 and .14 on this standardized measure, or about .2 s.d. units from each). Several important behavioral measures show the pattern of high achieving blacks more closely resembling their white than their black counterparts. The number of pages read in school and for homework is closer to the white than the black comparison group, and the high-achieving students of either race get considerably better grades. Moreover, the target group reports doing more homework than either group (1.0 hours/day compared to .8 and .9 hours).

Achievement differences. Not surprisingly, the reading proficiency level of high-achieving blacks (280 points) is closer to high-achieving whites (290) than to low-achieving blacks (226), since this was the criterion on which the groups

were formed. Nevertheless, high-achieving blacks still score nearly one-half standard deviation below their white counterparts on this measure, although more than 2 s.d.'s above the low-achieving black group.

It may be concluded from these comparisons that blacks who score above average more closely resemble their black counterparts in family and school social conditions (lower family and school SES, more likely to have working mothers, higher school minority enrollment and faculty, and a more authoritarian school environment with less student commitment). However, this group's behavioral patterns are closer to that of their high-achieving white than below-average black counterparts (more homework done, higher grades, a more positive use of their time, and a higher probability of attending Catholic school).

Analytic Approach

In all analyses, we interpret the NAEP reading proficiency measure as a proxy for student achievement or ability. The NAEP tests are designed to be more curriculum-specific than other common standardized achievement tests, but in order to give one set of items to a national sample of American students (who do not follow a common curriculum), it is clear that NAEP is measuring ability in reading in some sense. We acknowledge rather loose use of the terms "high ability" and "low ability", when in fact they indicate student scores above or below the mean on a specific measure of reading proficiency. As stated above, the high-ability black students are compared to two separate comparision groups. This requires two separate sets of analysis. These two analysis groups are characterized as (1) the within-black sample and (2) the high-ability sample.

Subsequent analyses which focus on each of the two analysis groups use an analysis of covariance (ANCOVA) framework. That is, ordinary least squares regression techniques are employed to examine the effect of a particular grouping dummy variable (either high-low ability for the within-black sample or a white-black contrast variable for the high-ability sample) on a set of dependent variables. Since the dependent variables are each measured in different metrics, and since we are interested in comparing the effects of different independent variables on the set of outcomes, we present our results as standardized regression coefficients (beta weights). Significance levels are also given for these coefficients. Significance levels have been been adjusted for the 2-stage probability sampling design of NAEP. That is,

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standard errors of all parameter estimates have been multiplied by 2, the design effect recommended by NAEP (User's Guide, 1986).

Within-black analyses. For this sample, we examine the effect of being a high- or low-ability black 8th grader (coded 0=low, 1=high) on three dependent measures: (1) a school variable measuring whether or not students are enrolled in Catholic school; (2) an academic behavioral measure of positive use of time (see Appendix for details of construction); and (3) self-reported school grades. The effect of high-ability status on these three outcome variables is evaluated under a multi-step hierarchical regression model. The first step is without statistical adjustment for other variables, revealing the mean group differences on each outcome unadjusted for other model variables. The second step includes adjustment for the set of family and personal background differences between students shown in Table 1. The third step adjusts for the characteristics of the schools students attend. These school characteristics can be divided into three categories: (a) school social context (school SES and the proportion of the faculty which is minority); (b) school climate (disciplinary climate and students' commitment to the school); and (c) school academic program (measures of the school's curricular exposure the proportion of the student body enrolled in remedial reading.

For the regressions which investigate positive use of time and grades, a dummy variable identifying whether or not the school is Catholic is included. For the regression which investigates the likelihood of Catholic school attendance, another step in the hierarchical regression is included, which adjusts for student academic behaviors (homework, TV, pages read, and GPA). Although we are interested in evaluating the effect of each of the independent variables described above on the three outcomes, our particular research question focuses on the effect of high-low ability status. Therefore, results are also presented which show the change in the effect of high-ability status on each outcome as the other sets of variables enter the regressions. Under this framework, we may examine whether the positive effect of high-ability status for blacks on Catholic school attendance, positive use of time, or grades, is entirely or partially explained by background differences, the schools these students attend, or by their academic behaviors which relate to their schooling.

High-ability student analyses. The analytic framework for these analyses is similar to that described above, except that the covariate of interest here is race (0=white, 1=black). All the models described above are identical for this sample, except that the covariate on which we focus in these analyses is the race variable. Since the mean reading achievement for these two high-achieving groups differs by over .5 s.d., we have examined the effect of race on the reading proficiency level of these above-average students. Of course, the range of variation is restricted for this dependent measure by having selected only the top half of the distribution. We look to the same sets of independent measures to "explain away" race differences in reading proficiency for these above-average students.

Limitations of NAEP Data

Spiraling. Although NAEP allows a somewhat comprehensive look at an age/grade group which has not received much research attention, there are some limitations to National Assessment data which restrict analytic models. Because of NAEP's sampling design (Note 2), only a relatively modest set of "common" background and behavioral measures are available for the entire sample for use in a regression model. All of these common background variables have been considered for use, and most appear in our models. A rich set of measures relating to reading and writing activities, teacher behaviors and classroom activities, family cultural and social activites, student in-school behaviors and study habits, and the like were collected as "spiraled variables." This means that information on spiraled variables is available for only about 10 percent of the sample. Since it is not the same 10 percent for all variables (variables are randomly assigned to students), regressions from correlation matrices which cross the variables are impossible, restricting statistical controls to the common background items gathered on individual students. School information is available for every school, resulting in a more comprehensive set of school than personal variables.

Plausible values. The same spiraling procedures apply to the cognitive items (i.e. reading proficiency scores) on NAEP. In order to assign reading scores to individuals, even though each individual has taken only a small subsample of the large array of reading proficiency items, proficiency scores on a common scale were imputed by NAEP (Note 3). This results in a set of 5 "plausible values" drawn from a distribution of such values for each individual.

In order to incorporate the additional error in these reading scores when using ordinary least squares regression techniques, special procedures have been recommended by the National Assessment for Educational Progress (1986, see pp. 79-80). Although NAEP recommends these procedures in regression analyses examining reading proficiency as a dependent measure, such procedures are unnecessary for other dependent measures, since those scores were not imputed. The regression on reading proficiency as a outcome included here follows the procedures recommended by the NAEP User's Guide.

Conditioning. Estimates of regression coefficients in an analysis of reading proficiency as an outcome measure may be biased. In order to compute plausible values, the data have been conditioned on certain demographic characteristics of students. This allows researchers to make unbiased estimates of group mean difference in reading proficiency between demographic groups defined by race, sex, parental education, residential location and the like. However, the conditioning process also leads to a likely bias in parameter estimates for variables (a) on which the data have not been conditioned, and (b) which are correlated with the conditioning variables. As this study focuses on a major conditioning variable, race, it is possible that parameter estimates of the effects of non-conditioned variables (i.e. school characteristics and student behaviors) are biased to an unknown extent. Moreover, it is likely that the bias lies in the direction of underestimating the effects of these factors on regressions which use reading proficiency as an outcome, thus possibly overestimating the effects of conditioning variables such as race. Thus, the results from regressions which examine race differences in reading proficiency for high-ability students should be interpreted cautiously. Readers interested in more detail on NAEP sampling, imputation, and conditioning methods are referred to Beaton, Mislevy, Kaplan, and Sheehan (1986), NAEP User's Guide (1986), and Mislevy (1985).

Results

High- and Low-Achieving Blacks

Three sets of simultaneous regression results are presented in Table 2, for the three dependent measures described previously: Catholic school attendance, positive use of time, and GPA. All results are presented as standardized regression coefficient metric. We focus on the magnitude of the dummy-coded

reading proficiency variable, which represents the effect of being in high-achieving group for black students.

Insert Table 2 about here

Catholic school attendance. Column 1 of Table 2 presents the results of the regression predicting Catholic school attendance. Positive coefficients are associated with the likelihood of Catholic school attendance for black 8th graders. Once the entire set of background, school, and behavioral measures are included, the relative likelihood of attending Catholic schools for high-achieving blacks (10% vs. 5%) has disappeared. However, residential location is strongly related, with black students from urban or rural areas much more likely to attend Catholic schools that the contrast group, suburban location. Note that student social class is not related to Catholic school attendance for black students. However, the Catholic schools blacks attend are very significantly more likely to be of higher average social class, and these Catholic schools are considerably more likely to have a higher minority faculty. Moreover, the Catholic schools which black 8th graders attend have fewer disciplinary problems. These schools are also somewhat more likely to present a more enriched curriculum, with a lower proportion of students in remedial reading. Finally, we see that black 8th graders who earn higher grades are more likely to be in Catholic than public schools. Almost 30% of the variance in school sector choice is explained by this model, and (understandably) school-level factors explain most of that variance.

Positive use of time. Black students of higher achievement are significantly more likely to display a more positive use of their time (more reading, more homework, and less television). Blacks of higher SES, especially females, are also more likely to use their time positively. The only school variable which relates to the postive use of time, once background and proficiency levels are controlled, is Catholic school attendance. That is, black students in Catholic schools are more likely to use their time positively. However, this particular prediction model explains only a small proportion (4%) of the variance in this dependent measure for black 8th graders.

GPA. High-achieving black 8th graders are, understandably, much more likely to get high grades. Most of the student and family background variables also

relate strongly to earning higher grades: social class, gender (female), and age (i.e., younger students get better grades). Both urban and rural location are negatively related to higher grades, meaning that black students living in suburban areas get better grades. Several school characteristics predict higher grades for black students. Black students in higher-SES schools, where there is a lower proportion of minority faculty, get better grades. Puzzlingly, black students in schools with more disciplinary problems and with more students in remedial reading get higher grades. Black students in Catholic schools are much more likely to get higher graders, as well as those with more exposure to an enriched curriculum.

Adjusted "achievement" effect. Although we are interested in the effect of each independent variable on each dependent variable, the particular research question focuses on the effect of high-low achievement status. In Table 3, the magnitude of the regression for the achievement dummy variable is presented under the following conditions: unadjusted, and successively adjusted for student/family background, school characteristics, and student academic behaviors. Under this framework, we may examine whether the postive effect of high-ability status for blacks on the three outcomes is partially or entirely explained by these factors.

Insert Table 3 about here

Results from the Catholic school attendance analysis (Column 1 of Table 3) show that high-achieving black 8th graders are more likely to attend catholic school, without taking other factors into account (step 1). Even after adjusting for family background, step 2 shows that these students are still more likely to attend Catholic schools. However, once we adjust for school characteristics (step 3), the likelihood of Catholic school attendance for high-ability black students has been "explained away."

These results suggest something about the schooling processes which foster high-achieving blacks students. The fact that the schools they attend are somewhat more likey to be are Catholic makes little difference (otherwise the regression coefficient after step 3 would remain significant). That such schools possess the climate and programs which induce high achievement in black students is what counts. The relative affluence of the black students who

attend Catholic schools makes a difference (i.e., the size of the regression coefficient is almost halved by introducing such controls), but the characteristics of the schools themselves also appears to be a major factor "explaining" high achievement in black students.

In Column 2 of Table 3, we see that high-achieving students use their time more positively (step 1). Even after adjusting for background differences, these students show a much higher value on this outcome (step 2). Adjusting for the characteristics of the schools students attend (step 3), however, has little effect on the more positive use of time exhibited by high-achieving black students. A similar pattern of progressive "explanation" of high-achieving blacks getting higher grades is seen in Column 3. That is, demographic, programmatic, and climate differences between schools (including, for these last two regressions, Catholic school attendance as a variable in the third step) do not explain why high-achieving black students both get better grades and appear to use their school-related time more positively.

High-Achieving Blacks and Whites

Table 4 presents a regression model identical to the one described in Table 2, with two exceptions: (1) the sample now contains high-achieving 8th grade students, both blacks and whites; and (2) the grouping variable of interest in this analysis of covariance design is now race (i.e. black=1, white=0). These analyses focus on explaining race differences among high-achieving students. Recall from Table 1 that, even for this selective sample, the average high-achieving black scores over one-half s.d. below his or her white counterpart. These analyses represent a search for explanations of the black reading proficiency disadvantage among above-average scorers.

Insert Table 4 about here

Catholic school attendance. Column 1 of Table 4 presents regression results for Catholic school attendance. Black high achievers are significantly less likely to attend Catholic school than whites, as are older students and those whose mothers work. Location differences are strong, showing that high-achieving students who live in either rural, but especially in urban areas are much more likely to attend Catholic schools. The same school characteristics which typified Catholic school attendance for black students are associated for high-

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achieving students of both races -- higher average school SES, lower minority faculty proportions, fewer disciplinary problems, more student commitment, and more exposure to an enriched curriculum. A significant but relatively weak relationship is found for students with higher grades, understandable since the variation of this variable is probably restricted for these students. This model explains 56 percent of the variance in Catholic school attendance.

Academic behaviors. Regression results for positive use of time and GPA resemble one another (Columns 2 and 3 of Table 4). In both, blacks are less likely to show these characteristics. Background factors are the strongest predictors of both positive use of time and higher grades (especially SES, female gender, and rural location). The contribution of school factors to explaining these two outcomes is considerably less than the background factors, but the patterns differ. For positive use of time (Column 2), higher student commitment is strongly associated. For GPA (Column 3), the major contributors are curriculum exposure and Catholic school attendance. Neither regression model explains much of the variance (less than 10 percent for both).

Adjusted race effect. How do these groups of variables (background, schools, behaviors) affect the size of the standardized regression coefficient for being black among these high-achieving 8th graders in Table 5? The patterns are considerably different from those in Table 3. Column 1 of Table 5 presents the results for the analysis investigating the likelihood of high-achieving blacks attending Catholic school. Without adjustment (step 1), blacks are no more or less likely to attend. After adjusting for the students' personal and family background differences (step 2), black high achievers are significantly less likely to attend (Note 4). However, the size of this negative effect is considerably diminished once the characteristics of the schools are controlled for (step 3). Additional adjustment for student academic behaviors (step 4) does not affect the black effect. A pattern somewhat similar to the likelihood of high-achieving blacks attending Catholic schools compared to their below-average black counterparts is shown: the characteristics of the schools themselves largely "explain away" the likelihood of high-achieving blacks attending Catholic schools.

Insert Table 5 about here

As before, the regression models for positive use of time and GPA are not effective in explaining the variance in these outcomes (Columns 2 and 3 of Table 5). Moreover, the progressive effects on this coefficient of adjusting for background and school characteristics are minor in explaining the black disvantage among high-achieving 8th graders on these outcomes. Even after controlling for background and school, black students' GPAs and time use are significant below that of whites.

Race differences in achievement. Our last analysis focuses on reading proficiency as an outcome measure, selecting the sample of black and white students whose proficiency is above average. Of course, this restricts the range on this measure. Nevertheless, since the reading proficiency levels of these black students was .5 s.d. below their white counterparts, we wish to investigate the possible background, school, and academic behavioral factors which might account for this difference. Using the same regression model described in Table 4, the results for the variation in reading proficiency are shown in Table 6.

Insert Table 6 about here

We have chosen to present the results as unstandardized regression coefficients (in Column 1 of Table 6) for methodological reasons. The process used to conduct statistical tests of significance with imputed scores requires the computation of two components of the standard error of the estimate (Note 5), shown in Column 2. Since these standard errors are in unstandardized regression coefficient units, we present the corresponding coefficients in the same metric -- "reading proficiency units." Both the mean values and standard deviations for the black and white groups are given in Table 2. The fact that these standard errors contain two variance components makes them larger than the standard errors used to compute significance levels in previous analyses.

On the reading proficiency of high-achieving students, the effect of being black is the largest effect in the model. That is, even after adjusting for the background differences between black and white students, for the differences in the schools they attend, and the academically-related behaviors which they exhibit, there is still a score difference of 9.5 points. This is, in fact, very close to the unadjusted mean difference between the two groups of 10.2

points. In addition to the large coefficient associated with race, only a few other variables in this model have a significant impact: SES, gender, age, and students' grades. All of these effects are in the direction seen in previous analyses. Moreover, we see in Table 7 that the magnitude of the decrease in the black score difference due to adding these groups of variables to our models is modest. In fact, the unadjusted regression coefficient associated with race (13.9 points) is larger than the mean differences between the groups shown in Table 1 (10.2 points -- Note 6).

Insert Table 7 about here

In fact, these results are quite anomylous with those from other studies which attempt to "explain" race difference in achievement (e.g. 1984; Coleman et al., 1982; Hoffer et al., 1985; Lee & Bryk, 1987). Those studies show that background, school, and behaviors are very powerful explanatory factors for the academic achievement differences between blacks and whites. Although we have followed the procedures suggested by NAEP (1986), we suspect that certain effects -- particularly those on which the data were not conditioned in the score imputation process (the school and behavioral factors) -- are underestimated in these regressions. All but one of the significant contributors to variation in reading proficiency for this sample are in fact those conditioning factors: race, sex, SES, and age. It seems likely that the conditioning process itself, which allows unbiased estimates of the means for subgroups (blacks, whites, males, females, etc.), actually taps the variance in the variables which are both correlated with these factors and also not incorporated into the conditioning process. We have selected variables in our models precisely <u>because</u> they were correlated with race differences in achievement, which means they are particularly prone to the bias described earlier. We therefore conclude that the results of this last regression analysis are less reliable than other analyses in this paper. We have included them only to broaden the picture of our analytic approach.

Discussion

It appears that background, school, and behavioral variables are less effective in explaining the reading proficiency disadvantage between high-achieving blacks and whites than in explaining behavioral differences (Catholic school attendance, positive use of time, and grades) between below- and above-average achieving black students. That is, differences in achievement within the group of black students are more easily explained than differences in achievement between black and white students within a higher ability group. Nevertheless, the results from this study indicate that characteristics of schools students attend, as well as the individual actions of students in those schools which relate to their academic performance, make substantive contributions to achievement differences between black and white junior high school students.

High-achieving black students are not very different from their black counterparts in several respects. Although they come from families which are more advantaged, their families' social class is still very considerably lower than that of high-achieving whites. Most black students, depite their achievement levels, have working morthers. Black students are much more likely to live in urban areas. The schools black students attend, whether the students' achievement as a group is above or below average, are rather similar. The average SES levels of the schools reflects the SES levels of the students, which is low. Rather more noteworthy is the fact that black students of all achievement levels are very likely to attend schools where at least half of the students (and over a third of the faculty) is minority. High achieving black students are <u>not</u> those (few) who attend mostly white suburban schools. Rather, the schools these students attend look remarkably like those attended by the majority of black students -- in cities, with disadvantaged and minority students, with relatively more discipline problems and less student commitment. One exception is that high-achieving black students are twice as likely to attend Catholic school, but neither group is found in Catholic schools in large numbers.

These students differ considerably from their lower-achieving black counterparts, however, and more closely resemble white students who score above average in achievement, in how they react to this school environment. They read consi-

derably more, do more homework, watch slightly less television, and generally make more positive use of their time. These behaviors appear to pay off in other ways besides producing higher achievement -- these students get higher grades, as well.

Despite the relatively less advantaged schools high-achieving black students attend (compared to whites), characteristics of the academic and normative environments of schools have a definite effect of student performance (especially on grades), particularly on the performance of black students. A more disciplined environment, exposure to an enriched curriculum which includes frequent classes in science, art, and music, and a rigorous program of remediation in reading appear to foster higher achievement among black students. These are environmental characteristics which are somewhat more likely to be found in Catholic than public schools (Lee and Bryk, 1988b). Although such factors were also shown here to predict Catholic school attendance for black 8th graders, once those factors were taken into account, the likelihood of attending Catholic schools for black students was no longer related to student ability.

Such characteristics of the academic and normative environment of schools have been less successful, however, in explaining the achievement differences between black and white students than among black students in this study. Although these same school characteristics have been demonstrated to be related to student behaviors like time use and academic performance for both blacks and whites, achievement differences between the two racial groups were not as successfully explained in models which compared black and white students as those which compared black students of different achievement levels.

It is also clear to us that regression-based causal modeling using data from the National Assessment is somewhat problematic. The traditional purpose of NAEP has not been to collect data to be used by educational researchers in such analyses, but rather to provide the nation with reliable estimates, over time, of American students' academic status and progress -- to serve as "the nation's report card." The availability of single-scale scores on all individuals was introduced by NAEP with its 1983-84 reading assessment, and was not a feature of previous assessments in any curricular area. Therefore, analyses using NAEP data from assessments prior to 1983-84 (e.g. Walberg & Tsai, 1985; Welch, et al., 1982) were unable to make use of the full NAEP samples. The computation of

such imputed scores, now routinely available on NAEP public-use data tapes, introduces considerable analytic difficulties for researchers.

It is our conclusion that the parameter estimates included in this study probably represent lower bounds of the true effects. Additionally, we suspect that race differences are somewhat magnified in causal analyses, since the the plausible values for the reading proficiency scores used in this study were conditioned on several student characteristics, including parental education and race. In some sense, therefore, the results of this study which have shown that process variables connecting with schooling do contribute to student academic behaviors, do reduce (somewhat) race differences in achievement, and account for race difference in behaviors among black students, are especially noteworthy.

Technical Notes

1. NAEP scores for all 3 grade levels are combined into a single scale which ranges from 0-500. This scale has been divided into 5 levels of proficiency:

   - o Rudimentary: 150 points or below;
   - o Basic: 151-200 points;
   - o Intermediate: 201-250 points;
   - o Adept: 251-300 points;
   - o Advanced: 301-350 points.

   It appears that the average 8th grader falls in the intermediate range, which NAEP defines as follows: "Performance at this level suggests the ability to search for specific information, interrelate ideas, and make generalizations" (NAEP, 1985, p. 15).

2. The very elaborate NAEP sample design combines Balanced Incomplete Block (BIB) and Unbalanced Incomplete Block (UBIB) designs, which assigned both cognitive (i.e. reading proficiency) items and background items to individuals. "BIB spiraling is a procedure by which only a small subset of items is given to an individual student, but the subsets are administered in such a way that each pair of items is given to a nationally representative subsample of students" (NAEP Users' Guide, 1986, p.8).

3. The particular imputation process to produce these scores uses both conventional item response theory (IRT) scaling and jackknifing techniques described in the Users' Guide (NAEP, 1986, pp. 79-91). We have attempted to follow the procedures recommended by the authors of this Users' Guide. However, the process of running regression analyses over 5 separate scores for each individual is necessary only for the single regression which examines the reading proficiency plausible values as an outcome.

4. The fact that this regression coefficient increases when background is controlled for is an example of a suppression effect. That is, we know that although blacks are less likely to attend Catholic schools, they are more likely to be reside in urban areas. Catholic schools are also more likely to be found in urban areas. The fact that the correlations between these variables form a pattern of negatives and positives cause what Cohen and Cohen (1975) call "cooperative supression." Although an interesting topic, we choose to ignore it for these analyses.

5. This anomalous result is due to the imputation process. The adjusted standard error is the sum of two components. The first is the average of the 5 standard errors from the regressions on the 5 reading scores. This component is doubled, to adjust for a design effect of 2 (component due to measurement error). The second component is that due to variation across the 5 regression coefficients (component due to imputation error). These two components are each squared, then summed. The adjusted standard error is the square root of that sum.

6. The difference between these two values is also due to the plausable values. Whereas the means shown on Table 1 are from a single one of the 5 plausible values, the unadjusted regression coefficient in Table 7 is the average of 5 parameter estimates from regressions on the 5 plausable values for reading proficiency for each subject.

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Table 1 8th Grade Means On Student/Family Background, School Characteristics, and Student Academic Behaviors for 3 Groups: Below-Average Achieving Blacks, Above-Average Achieving Blacks, and Above-Average Achieving Whites

	Blacks Achieving Below Average	Blacks Achieving Above Average	Whites Achieving Above Average
Sample Size	1894	661	7480
Student/Family Background:			
Social Class	-.97 (1.9)(a)	-.22 (1.6)	.39 (1.5)
% Female	.50 (.50)	.56 (.49)	.54 (.50)
Age in Months	169 (9.8)	164 (6.7)	164 (1.4)
% Whose Mothers Work	.70 (.46)	.75 (.43)	.65 (.48)
% Urban	.46 (.50)	.45 (.50)	.21 (.41)
% Rural	.32 (.46)	.26 (.44)	.33 (.47)
School Characteristics:			
School Size	752 (434)	740 (460)	734 (464)
Students/Faculty	19.9 (5.5)	20.6 (5.9)	19.8 (5.5)
School SES	-1.39 (1.9)	-.83 (1.8)	.29 (1.49)
% Minority Enrollment	.53 (.34)	.48 (.33)	.12 (.17)
% Minority Faculty	.40 (.29)	.33 (.28)	.08 (.12)
Disc.Climate Factor	.37 (1.1)	.23 (1.1)	-.11 (.95)
Student Commitment	-.52 (.95)	-.30 (.98)	.15 (.95)
Curriculum Exposure	.18 (1.0)	-.06 (1.0)	.06 (.97)
% Remedial Reading	.23 (.22)	.18 (.17)	.11 (.11)
% in Catholic School	.05 (.22)	.10 (.30)	.12 (.32)
Student Academic Behaviors:			
Pages Read/Week(g)	9.62 (7.3)	10.19 (6.7)	10.71 (6.8)
Homework, Hrs/Day	.83 (.79)	.98 (.81)	.87 (.76)
Television,Hrs/Day	4.27 (1.9)	4.03 (1.8)	2.98 (1.6)
Positive Use of Time Factor(h)	-.29 (1.0)	-.10 (1.0)	.14 (.96)
Grades (GPA)	2.57 (.79)	2.94 (.77)	3.12 (.77)
Reading Score	226.0 (25)	279.7 (15)	289.5 (19)

(a)Standard deviation of the mean score for each group.

Table 2 Black 8th Graders: Standardized Regression Coefficients (Betas) for the Effect of Above- or Below-Average Reading Proficiency on the Likelihood of Catholic School Attendance, Positive Use of Time, and Grade Point Average

	Dependent Variables		
	Catholic School Attendance	Postive Use of Time	Grade Point Average
Independent Variables:			
Reading Proficiency (a)	-.00	.06***	.15***
Student/Family Background:			
Social Class	.01	.13***	.12***
Female	.02	.06**	.09***
Age	-.01	.02	-.17***
Mother Working	.01	.02	.01
Urban	.41***	.02	-.09***
Rural	.26***	.02	-.07*
School Characteristics:			
School Social Class	.43***	-.04	.22***
% Minority Faculty	.16***	.04	-.08**
Disciplinary Climate	-.23***	-.02	.07**
Student Commitment	.00	-.02	.04
Curriculum Exposure	.07***	.04	.07***
% Remedial Reading	-.06**	-.03	.09***
Catholic School	---	.05*	.16***
Student Academic Behaviors:			
Pages Read	.00	---	---
Homework, Hrs/Day	.00	---	---
Television, Hrs/Day	.02	---	---
Grade Point Average	.14***	---	---
% Variance Explained (R^2)	29.2	3.6	13.9

(a) Proficiency score divided at the population mean, and below average=0, above average=1.

Table 3 Black 8th Graders: Standardized Regression Coefficients of High-Low Reading Proficiency Dummy Variable Before After Successive Adjustments for Family Background, School Characteristics, and Student Academic Behaviors

	Dependent Variables		
	Catholic School Attendance	Postive Use of Time	Grade Point Average
Adjustment Steps(a):			
Unadjusted	.079***	.085***	.214***
Student/Family Background	.046**	.063**	.156***
School Characteristics	.019	.064**	.154***
Student Academic Behaviors	-.004	---	---

(a) The variables included in these adjustment steps are exactly those listed as independent variables under each grouping category in Table 2. The beta coefficient for reading proficiency in the last step is the same as that shown in Table 2 for that variable.

Table 4 High-Achieving 8th Graders: Standardized Regression Coefficients (Betas) for the Effect of Being Black on the Likelihood of Catholic School Attendance, Positive Use of Time, and Grade Point Average

	Dependent Variables		
	Catholic School Attendance	Postive Use of Time	Grade Point Average
Independent Variables:			
Black (a)	-.04***	-.04***	-.05***
Student/Family Background:			
Social Class	.02	.21***	.23***
Female	-.01	.11**	.10***
Age	-.03***	.02	-.05***
Mother Working	-.02*	.00	-.04**
Urban	.62***	.04**	.01
Rural	.07***	.09***	.05***
School Characteristics:			
School Social Class	.18***	.03	-.04*
% Minority Faculty	.03**	.03*	.03*
Disciplinary Climate	-.13***	.00	-.03*
Student Commitment	.04***	.09***	.03*
Curriculum Exposure	.15***	.00	.04**
% Remedial Reading	-.02	-.02	.02
Catholic School	---	.02	.05**
Student Academic Behaviors:			
Pages Read	.01	---	---
Homework, Hrs/Day	.02	---	---
Television, Hrs/Day	.01	---	---
Grade Point Average	.02**	---	---
% Variance Explained (R^2)	55.6	7.4	8.0

(a) Dummy variable, black=1, white=0.

Table 5 High-Achieving 8th Graders: Standardized Regression Coefficients for Black Race Dummy Variable Before and After Successive Adjustments for Family Background, School Characteristics, and Student Academic Behaviors

	Dependent Variables		
	Catholic School Attendance	Postive Use of Time	Grade Point Average
Adjustment Steps[a]:			
Unadjusted	-.019	-.068***	-.066***
Student/Family Background	-.120**	-.053**	-.046***
School Characteristics	-.038***	-.044**	-.055***
Student Academic Behaviors	-.039***	---	---

(a) The variables included in these adjustment steps are exactly those listed as independent variables under each grouping category in Table 4. The beta coefficient for black race variable in the last step is the same as that shown in Table 4 for that variable.

Table 6 High-Achieving 8th Graders: Unstandardized Regression Coefficients for the Effect of Being Black on Reading Proficiency

	Unstandardized Reression Coefficient	Adjusted(a) Standard Error
Independent Variables:		
Black	-9.54***	(2.16)
Student/Family Background:		
Social Class	1.81***	(0.48)
Female	2.69**	(0.94)
Age	-0.26*	(0.11)
Mother Working	0.40	(0.91)
Urban	-0.66	(1.42)
Rural	-0.22	(1.85)
School Characteristics:		
School Social Class	-0.07	(0.39)
% Minority Faculty	-0.04	(0.04)
Disciplinary Climate	-0.18	(0.65)
Student Commitment	0.63	(0.71)
Curriculum Exposure	-0.10	(0.49)
% Remedial Reading	-0.05	(0.04)
Catholic School	0.89	(1.91)
Student Academic Behaviors:		
Pages Read	0.01	(0.07)
Homework, Hrs/Day	0.35	(0.57)
Television, Hrs/Day	-0.41	(0.29)
Grade Point Average	5.83***	(0.82)
% Variance Explained (R^2)	9.6%	

(b) The adjusted standard error is the sum of two components. The first is the average of the 5 standard errors from the regressions on the 5 reading scores. This component is doubled, to adjust for a design effect of 2 (component due to measurement error). The second component is that due to variation across the 5 regression coefficients (component due to imputation error). These two components are each squared, then summed. The adjusted standard error is the square root of that sum.

Table 7 High-Achieving 8th Graders: Unstandardized Regression Coefficients on Reading Proficiency for Black Race Dummy Variable Before and After Successive Adjustments for Family Background, School Characteristics, and Student Academic Behaviors

	Dependent Variable
	Reading Proficiency
Adjustment Steps(a):	
Unadjusted	-13.94***
Student/Family Background	-12.46***
School Characteristics	-10.70***
Student Academic Behaviors	-9.54***

(a)The variables included in these adjustment steps are exactly those listed as independent variables under each grouping category in Table 4. The unstandardized regression coefficient for black race variable in the last step is the same as that shown in Table 4 for that variable.

Appendix

Definition of Constructed Variables Used in Analyses

SOCIAL CLASS	Sum of two standardized variables: parental education (sum of mother and father) and a sum of educationally related household possessions (daily newspaper, dictionary, encyclopedia, more than 25 books, magazine subscriptions, and computer).
% WHOSE MOTHERS WORK	Student report of whether their mother worked outside the home, either full time or part time.
SCHOOL SES	Sum of percent of students in the school below the poverty line (Orshansky percentile, reverse coded) and the proportion of the student body with free or reduced lunch (negatively coded).
% MINORITY ENROLLMENT, FACULTY	Combines proportions of the student body and faculty who are (a) black or (b) Hispanic.
DISCIPLINARY CLIMATE FACTOR	Principal components factor of principal's rating of: (a) time spent in the last month on discipline; (b) number of students expelled or suspended in the last year; (c) the average daily absentee rate during the current year; and (d) time spent in the last month on curricular matters (coded negatively). A negative rating on this variable may be interpreted as a less authoritarian school atmosphere.
STUDENT COMMITMENT	Principal components factor created from principals' reports of school problems with (a) student absenteeism; (b) parental interest; and (c) low standards for students. The factor was reverse coded, so that a higher value indicates more student and family commitment to the school.
CURRICULUM EXPOSURE	Principal components factor from principals' reports of whether or not art, music, and science courses were offered in the school at least once a week.
PAGES	Student reports of the number of pages read either in school or for homework, which related to school-assigned work.
POSITIVE USE OF TIME	Principal components factor made from reports of pages read, hours spent doing homework the previous day, and hours per day spent watching television (negative loaded).